

REMARKS

This application has been reviewed in light of the Office Action dated December 8, 2003. In view of the foregoing amendments and the following remarks, favorable reconsideration and withdrawal of the rejection set forth in the Office Action are respectfully requested.

Claims 1-8 are pending. Claims 1, 3-5, 7 and 8 have been amended. Support for these changes can be found in the original disclosure, and therefore no new matter has been added. Claims 1 and 5 are in independent form.

Claims 1-8 have been rejected under 35 U.S.C. § 102(b) as being anticipated by JP 6-171089 (*Utsunomiya*). Applicants respectfully traverse this rejection.

Independent Claim 1 recites, *inter alia*, a step of forming a recessed portion corresponding to an opening in a second surface of a base material by patterning a mask layer on the second surface of the base material and by effecting etching in the second surface via the mask layer of the second surface, and a step of forming nozzle grooves and the opening in the base material for communicating the recessed portion with the nozzle grooves, by patterning a mask layer on a first surface of the base material and by effecting etching in the first surface and the recessed portion via the mask layer of the first surface and the mask layer of the second surface. Independent Claim 5 recites features similar to those of Claim 1.

According to the invention as set forth in Claim 1, a recessed portion is formed by etching a second surface of a base material of a nozzle member. Specifically, a recessed portion is formed that does not penetrate the base material. Then, nozzle grooves are formed by etching a first surface of the base material, and an opening penetrating the nozzle grooves is formed by

etching the recessed portion. Since the first surface of the base material has a $\langle 110 \rangle$ crystal face orientation, nozzle walls can be formed vertically so that the nozzle grooves have a vertical cross-section, because etching grows along the $\langle 111 \rangle$ face and the $\langle 111 \rangle$ face is perpendicular to a surface having a $\langle 110 \rangle$ crystal face orientation. See, e.g., page 13, lines 3-15 of the specification.

According to the method of Claim 1, the depth of the recessed portion can be adjusted so that a nozzle groove having a rectangular cross-section with a desired depth can be formed. In this regard, e.g., to control the depth, the nozzle grooves and the opening cannot be formed by a single etching, but rather patterning of the mask and etching of the silicon must be effected two times. See, e.g., page 13, line 16 - page 14, line 7 and page 14, line 26 - page 15, line 13 of the specification.

The rectangular cross-section of the nozzle grooves also permits arrangement of the nozzle grooves in high density.

Utsunomiya relates to an ink jet printing head and a method of manufacture thereof. According to Applicants' understanding, in *Utsunomiya* an opening 2' and ink supply port 2 are formed by anisotropically etching first and second surfaces of a base material simultaneously (see, e.g., paragraph [0016]: "forming simultaneously the ink feed hopper connected with the above-mentioned nozz . . . (*sic*) and all nozzles . . ."). Nothing in *Utsunomiya* would teach or suggest forming a recessed portion by etching a second surface of a base material of a nozzle member, and then forming nozzle grooves and an opening for communicating the recessed portion with the nozzle grooves by etching a first surface of the base material and the recessed portion, such as are recited in Claim 1.

According to Applicants' understanding, in *Utsunomiya* a nozzle having a rectangular cross-section cannot be formed with a desired depth. As shown in *Utsunomiya*'s Fig. 4, a nozzle groove having a depth equal to approximately half the thickness of the base material may be formed by *Utsunomiya*'s method (see, e.g., paragraph [0013]). In contrast to the method recited in Applicants' Claim 1, *Utsunomiya*'s method does not permit adequate adjustment of the depth of the nozzle groove.

In addition, if the cross-section of the nozzle groove is formed to be triangular using *Utsunomiya*'s method, the nozzle grooves cannot be arranged as densely as could nozzle grooves having a rectangular cross-section of the same area, which can be produced according to the method of Claim 1

Since *Utsunomiya* does not contain all of the elements of independent Claims 1 or 5, those claims are believed allowable over that reference.

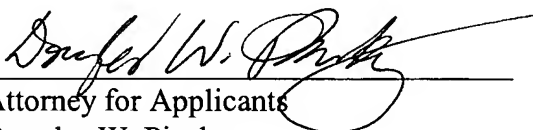
A review of the other art of record has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as a reference against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



Attorney for Applicants
Douglas W. Pinsky
Registration No. 46,994

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200
DWP/tmc